

ABSTRACT

Title of Document: STRING QUARTET

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This is a String Quartet in three movements. It is an example of the use of set theory and combinatorial analysis in music composition. Harmony is created by the combination of four-tone sets into eight-tone sets. Contrapuntal devices, such as the arrangement of set elements to create maximum intervallic variety are explored in the second movement. This movement is also the focus of a complex pattern based on eight tone sets. Five of the tones are used regularly, while the other three tones are used to disrupt a sense of regularity.

STRING QUARTET

By

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String Quartet No. 1

Allegro ♩ = 120

Jacob Polasky

Violin 1

Violin 2

Viola

Violoncello

p *ff* *p* *pp* *ff* *p* *pp*

Detailed description: This block contains the first six measures of the String Quartet No. 1. The score is written for Violin 1, Violin 2, Viola, and Violoncello. The time signature changes from 2/4 to 3/4 and back to 2/4. The Violoncello part features a prominent bass line with dynamic markings *p*, *ff*, and *p*. The Viola part has a *pp* marking in measure 2. The Violin parts have various dynamic markings including *p*, *ff*, and *p*.

7

♩ = ♩ sempre

A

Vln. 1

Vln. 2

Vla.

Vc.

ff *p* *f* *sfz* *p* *f* *pizz.* *f* *3*

ff *p* *sfz* *sfz* *sfz* *sfz* *p* *f* *pizz.* *f* *pizz.* *ff* *p* *ff* *p*

Detailed description: This block contains measures 7 through 11 of the String Quartet No. 1. Measure 7 is marked with a '7' and '♩ = ♩ sempre'. Measure 8 is marked with a boxed 'A'. The Violoncello part has a *f* marking in measure 8 and a *ff* marking in measure 9. The Violin 1 part has a *f* marking in measure 8 and a *pizz.* marking in measure 9. The Violin 2 part has a *f* marking in measure 8 and a *pizz.* marking in measure 9. The Viola part has a *f* marking in measure 8 and a *pizz.* marking in measure 9. The Violoncello part has a *f* marking in measure 8 and a *pizz.* marking in measure 9. The Violin 1 part has a *f* marking in measure 8 and a *pizz.* marking in measure 9. The Violin 2 part has a *f* marking in measure 8 and a *pizz.* marking in measure 9. The Viola part has a *f* marking in measure 8 and a *pizz.* marking in measure 9. The Violoncello part has a *f* marking in measure 8 and a *pizz.* marking in measure 9.

13

Vln. 1

Vln. 2

Vla.

Vc.

p *f* *ff* *p* *mp* *f*

arco

19

Vln. 1

Vln. 2

Vla.

Vc.

pizz. *f* *mf* *p*

p *mp*

(pizz.) Quasi guitarra

Quasi guitarra

B

23

Vln. 1 arco *pp* *f* *pp* *ff* *p* *ff* *p* *f* *ritard*

Vln. 2 arco *pp* *f* *pp* *ff* *p* *ff* *p* *f*

Vla. arco *pp* *f* *pp* *f* *p* *ff* *p* *f*

Vc. *ff* *ff* *f* *p* *ff* *p* *f*

C

28 a tempo

Vln. 1 *p* *f* *p* *mp* *ff* *p* *f* *sfz*

Vln. 2 *p* *f* *p* *mp* *ff* *p* *f* *sfz*

Vla. *p* *f* *p* *p* *ff* *pp* *f* *sfz* *Leggiero arco* *f*

Vc. *p* *f* *p* *pp* *ff* *pp* *f* *sfz* *arco* *f*

36

Vln. 1

arco

p *f* *f*

Vln. 2

arco

sul pont.

ord.

sul pon.

ord.

f *p* *f*

Vla.

sul pont.

ord.

sul pont.

p *f* *p*

Vc.

pizz.

f

42

Vln. 1

p *p* *f* *p* *f*

Vln. 2

p *f* *3* *f* *3*

Vla.

ord.

Leggiero arco

mf *f*

Vc.

arco

f

49 **Con forza** **D** L'istesso tempo

Vln. 1

Vln. 2

Vla.

Vc.

ord.

subp *ff* *sfz*

f *subp* *ff* *sfzp* *f*

subp *ff* *sfzp* *f*

subp *ff* *sfzp* *f*

arco

54

Vln. 1

Vln. 2

Vla.

Vc.

p *mp* *p*

p *mp* *p*

p *mp* *p*

p *mp* *p*

subf *p* *f* *p*

f *ff* *f*

pizz.

pizz.

Delicato

57

Vln. 1

Vln. 2

Vla.

Vc.

p

f *3* *p* *f*

p *3* *f*

arco *3* *3* *3* *3*

sfzp

Detailed description: This system contains measures 57 through 60. Vln. 1 and 2 have long horizontal lines indicating sustained notes. Vln. 1 has a triplet of eighth notes in measure 59. Vla. and Vc. play continuous triplet patterns of eighth notes. Measure 58 has a *p* dynamic. Measure 59 has *f* dynamics for Vln. 1 and Vln. 2, and *sfzp* for Vla. and Vc. Measure 60 has *f* dynamics for Vln. 1 and Vln. 2, and *arco* for Vla. and Vc. The time signature changes from 3/4 to 3/4.

61

Vln. 1

Vln. 2

Vla.

Vc.

p

mf *3*

f *3*

pizz. *ff* *3*

pizz. *ff* *3*

arco *fp* *3*

f *3*

mp *3* *ff*

subp *ff*

Detailed description: This system contains measures 61 through 64. Vln. 1 and 2 play triplet patterns of eighth notes. Vla. and Vc. also play triplet patterns. Measure 61 has a *p* dynamic for Vln. 1. Measure 62 has *mf* for Vln. 1 and *f* for Vln. 2. Measure 63 has *f* for Vln. 2 and *mp* for Vln. 1. Measure 64 has *pizz.* and *ff* for Vln. 1 and Vln. 2, and *subp* and *ff* for Vla. and Vc. The time signature changes from 3/4 to 4/4.

E Dolce ♩ = ♩ = 60

66 arco

Vln. 1

Vln. 2

Vla.

Vc.

p *f* *pp* *p* *f* *p* *f* *p*

p *f* *pp* *p* *f* *p* *f* *p*

p *f* *pp* *p* *f* *p* *f* *p*

p *f* *pp* *p* *f* *p* *f* *p*

F ♩ = 120

74

Vln. 1

Vln. 2

Vla.

Vc.

ff *pp* *p* *ff* *p*

ff *p* *ff* *p* *mf*

ff *pp* *pp* *ff* *p* *p*

ff *pp* *pp* *ff* *p* *pp*

80

Vln. 1

f

pp

pp

p

pp

p

pp

Vln. 2

f

pp

pp

pp

Vla.

f

pp

pp

p

pp

pp

Vc.

f

pp

sfzpp

Detailed description: The musical score is for measures 80 through 84. Measure 80 is in 3/4 time, measure 81 is in 3/4 time, measure 82 is in 4/4 time, measure 83 is in 4/4 time, and measure 84 is in 4/4 time. The instruments are Violin 1, Violin 2, Viola, and Violoncello. Violin 1 and Violoncello start with a forte (f) dynamic in measure 80, then switch to pianissimo (pp) in measure 81. Violin 2 and Viola also start with f in measure 80 and switch to pp in measure 81. In measure 82, Violin 1 has a crescendo from pp to p and then back to pp. Violoncello has a crescendo from pp to p and then back to pp. In measure 83, Violin 1 has a crescendo from p to pp. Violoncello has a crescendo from p to pp. In measure 84, Violoncello has a sforzando (sfz) dynamic followed by pianissimo (pp). The Viola and Violin 2 parts have a crescendo from pp to p in measure 83 and then back to pp in measure 84. The Violin 1 part has a crescendo from p to pp in measure 83 and then back to p in measure 84.

II

Giocosu con brio

Jacob Polasky

 $\text{♩} = 90$ ($\text{♩} = 180$)

Violin 1

Violin 2

Viola

Violoncello

pizz.

p *f*

sfzp *sfzp* *sfzp*

sfzp *sfzp* *sfzp*

sfzp *f* *p* *sfzp* *f* *sfzp*

Vln. 1

Vln. 2

Vla.

Vc.

subp

pizz.

arco

p

spiccato

subp

pizz.

p

f

ff *f* *p* *f*

10

13

Vln. 1

Vln. 2

Vla.

Vc.

ff

subp

pp

arco

ff

subp

pp

arco

subp

pp

arco

subp

pp

(pizz.)

subpp

ff

subp

f

A

20

Vln. 1

Vln. 2

Vla.

Vc.

p

p

p

f

p

sfzp

B

26

Vln. 1 *p* pizz. *p* *f* arco *subp*

Vln. 2 *p* pizz. *p* *f* arco *subp*

Vla. *p* pizz. *p* *f* arco *subp*

Vc. *p* *ff p* *f p* *f* arco *subp*

33

Vln. 1 *mf*

Vln. 2 *mf*

Vla. *mf*

Vc. *f*

[illegible]

C

50

Vln. 1

Vln. 2

Vla.

Vc.

pp

pizz.

p

f

D

56

Vln. 1

Vln. 2

Vla.

Vc.

pp

arco

p

III

♩ = 88

Violin 1

Violin 2

Viola

Violoncello

ppp p f p

p f p

p f p

ppp p f p

5

Vln. 1

Vln. 2

Vla.

Vc.

p mp < f p

p f p

p f p

p f p

poco rit.

A

a tempo

10

Vln. 1

Vln. 2

Vla.

Vc.

f

sfzp

f

p

f

sfzp

p

f

sfzp

f

p

f

sfzp

f

p

incalzando

14

Vln. 1

Vln. 2

Vla.

Vc.

f *p*

mf

f *p*

mf

f *p*

mf

sul pont.

mf *sfzp*

sfzp *sfzp* *sfzp* *sfzp*

B a tempo

17

Vln. 1

Vln. 2

Vla.

Vc.

rit.

p

mf

f

f

p

mf

f

f

mp

f

f

mf

f

f

gliss. sul pont.

f

pp

C a tempo

20

Vln. 1

Vln. 2

Vla.

Vc.

poco rit.

p

mp

f

p

f

f

ff

p

mp

f

p

sul pont.

sul pont.

sul pont.

ord.

23

Vln. 1

p \triangleleft *f* \triangleright *sfzp* \triangleleft *f* \triangleright *ord.* *gliss.* *p*

Vln. 2

p \triangleleft *f* \triangleright *sfzp* \triangleleft *f* \triangleright *mp*

Vla.

p \triangleleft *f* \triangleright *sfzp* \triangleleft *f* \triangleright *mp*

Vc.

f \triangleright *p* *sfzp* \triangleleft *sfzp* \triangleleft *sfzp* *ord.*

27

Vln. 1

mp *ord.* *f*

Vln. 2

p *mp* *f*

Vla.

p *mp* *f* *pizz.*

Vc.

f *pizz.*

D L'istesso tempo
Mysterioso

19

32

Vln. 1

sfzp *ff* *p*

Vln. 2

sfzp *f < ff* *p*

Vla.

sfzp *mp* *ff* *p*

Vc.

sfzp *p* *ff* *p*

con sord. sul pont.

3 3 3 3

36

Vln. 1

mf *ff*

Vln. 2

p *ff*

Vla.

p *ff*

Vc.

ff

3 3 3 3

38

Vln. 1

Vln. 2

Vla.

Vc.

ff *p* *subf*

f *f* *mp* *p* *f*

41

Vln. 1

Vln. 2

Vla.

Vc.

ord.

senza sord.

pp *p* *f*

senza sord.

senza sord.

senza sord.

44 **E** (ord.)

Vln. 1

Vln. 2

Vla.

Vc.

mp *f* *p* *subp* *subf* *f*

ord.

sfzp *ff* *subp* *subf*

p

49

Vln. 1

Vln. 2

Vla.

Vc.

p *f* *subp*

p *f* *subp*

f *subp*

p *f* *subp*

gliss.

F

52

Vln. 1

Vln. 2

Vla.

Vc.

f *p* *f* *mf* *pp* *p*

3 3 3 3 3

gliss.

56

Vln. 1

Vln. 2

Vla.

Vc.

f *pp* *pp* *pp* *f* *pp*

gliss.

A musical score for four string instruments: Violin 1 (Vln. 1), Violin 2 (Vln. 2), Viola (Vla.), and Cello (Vc.). The score is divided into three measures. Measure 1 has a 4/4 time signature. Measures 2 and 3 have a 3/4 time signature. Vln. 1 starts with a treble clef and a key signature of one flat (B-flat). Vln. 2 also has a treble clef and a key signature of one flat. Vla. has an alto clef and a key signature of one flat. Vc. has a bass clef and a key signature of one flat. Dynamics include fortissimo (f), piano (p), and sforzando (sf). Articulation includes accents (^) and staccato (stacc.). Performance instructions include "delicato" and "pizz." (pizzicato). Fingerings are indicated by numbers 1-3. A rehearsal mark "60" is at the beginning.

APPENDIX I

Set A [C, C#, D, Eb]

Set B [C, C#, G, A]

A U A

A ₀	C	C#	D	Eb	IV
A ₁	C#	D	Eb	E	III
A ₂	D	Eb	E	F	II
A ₃	Eb	E	F	F#	I
A ₄	E	F	F#	G	0
A ₅	F	F#	G	G#	0
A ₆	F#	G	G#	A	0
A ₇	G	G#	A	Bb	0
A ₈	G#	A	Bb	B	0
A ₉	A	Bb	B	C	I
A ₁₀	Bb	B	C	C#	II
A ₁₁	B	C	C#	D	III

A U B

B ₀	C	C#	G	A	II
B ₁	C#	D	G#	Bb	II
B ₂	D	Eb	A	B	II
B ₃	Eb	E	Bb	C	II
B ₄	E	F	B	C#	I
B ₅	F	F#	C	D	II
B ₆	F#	G	C#	Eb	II
B ₇	G	G#	D	E	I
B ₈	G#	A	Eb	F	I
B ₉	A	Bb	E	F#	0
B ₁₀	Bb	B	F	G	0
B ₁₁	B	C	F#	G#	I

Set combinations with zero notes in common

$$A_0 + A_4 \quad A_0 + A_8$$

$$A_0 + A_5 \quad A_0 + B_9$$

$$A_0 + A_6 \quad A_0 + B_{10}$$

$$A_0 + A_7$$

APPENDIX II

Set Z [C, A, B, G#, F#]

[Bb, C] \cap Z

Z ₀	C	A	B	G#	F#	
Z ₁	C#	Bb	C	A	G	
Z ₂	D	B	C#	Bb	G#	
Z ₃	Eb	C	D	B	A	
Z ₄	E	C#	Eb	C	Bb	
Z ₅	F	D	E	C#	B	
Z ₆	F#	Eb	F	D	C	*
Z ₇	G	E	F#	Eb	C#	
Z ₈	G#	F	G	E	D	
Z ₉	A	F#	G#	F	Eb	*
Z ₁₀	Bb	G	A	F#	E	
Z ₁₁	B	G#	Bb	G	F	

Sets Z₂ and Z₄ contain the notes Bb and C.

II
B

Appendix III

Vln I G B C# D - Bb - Eb B Db G - E - C - D F Ab C A Bb A - F# - C
Vcl Ab F Eb C - D - C Db E Ab C D Eb - B - E C D Bb G F G -

